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of

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for

**UNIQUE PRINTER PASS CODE
SYSTEM AND METHOD**

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UNIQUE PRINTER PASS CODE SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to systems and methods for remotely providing a unique pass code that is recognizable by a printer. More specifically, the present invention relates to systems and methods that automatically generate a pass code based upon a unique characteristic of the printer and recognizing the pass code by the printer.

2. The Relevant Art

As printer systems increase in complexity and functionality, increased demands are being placed on the printers. For instance, in certain cases, it is desirable to generate a line of printers with varying capabilities. One way to decrease the cost of manufacturing the printers is to make certain features dormant until initialized.

Additionally, printer manufacturers may want to control the enablement of these features. For instance, certain features may require added attention for safety, longevity, or effectiveness purposes. It may be desirable to ensure that operators of these printers have been given proper instruction and training for use of the feature. Additionally, different price points can be achieved for the same printer by enabling only features that are paid for by the customer.

Being able to enable features of a printer after sale of the printer provides the added benefit of allowing customers the luxury of electing to purchase the features after purchasing the printer. Under such a scheme, a customer is allowed to buy the printer without paying for a feature, and to decide later that the feature is desirable. The customer can then contact the printer manufacturer's customer service department and request the feature. After paying

1 the requisite price, and/or undertaking certain training or receiving precautions, the feature
2 is then enabled for the customer.

3 In order to make the process of enabling inherent but dormant features of printers
4 more convenient and effective, it would be beneficial to be able to remotely enable the
5 features. In so doing, it would be particularly beneficial to be able to do so in a manner which
6 is unique to each printer and which is not readily apparent to a customer.

7 Pass codes have been used in the prior art to enable dormant features of products.
8 Nevertheless, the use of pass codes as conducted by the prior art does not meet the particular
9 requirements discussed above as being beneficial for printers. For instance, prior art pass
10 codes are typically standard for a whole line of printers. When a customer has more than one
11 printer, the customer only needs the one pass code and can enable the feature for each of the
12 printers. Additionally, these pass codes run the danger of becoming publically and universally
13 known.

14 Accordingly, it would be beneficial to provide a system and method of uniquely and
15 remotely generating a pass code that is unique to a printer and for independently validating
16 the pass code by the printer. Such a system and method are disclosed herein. Furthermore,
17 many printers are not configured to allow users to conveniently allow a user to add large
18 numbers, so it would be even more beneficial to provide a pass code that is easily entered by
19 a user.

OBJECT AND BRIEF SUMMARY OF THE INVENTION

The printer configuration system and method of the present invention have been developed in response to the present state of the art, and in particular, in response to the problems and needs in the art that have not yet been fully solved by currently available printer systems and methods. Accordingly, it is an overall object of the present invention to provide a printer pass code system and method that overcome many or all of the above-discussed shortcomings in the art.

To achieve the foregoing object, and in accordance with the invention as embodied and broadly described herein in the preferred embodiment, a printer pass code system and method for remotely generating a unique passcode recognizable by a printer are provided.

The printer pass code system in one embodiment comprises a unique character string assigned to a printer, a manipulation algorithm for mathematically manipulating the unique string, and a verification module within the printer for recognizing the mathematically manipulated character string as a pass code. The unique character string may comprise a printer serial number resident within the printer and may be programmed into a digital controller of the printer during manufacturing of the printer.

In one embodiment, the manipulation algorithm is embodied within a computer program that is configured to receive the character string as input, conduct mathematical manipulations on the character string, and output the result as the pass code. Preferably, one of the mathematical manipulations is a truncation operation whereby the mathematically manipulated serial number is truncated into a shorter string of characters.

The printer is preferably configured to receive entry of the pass code by a user and pass the pass code to the verification module. The verification module is preferably located within the printer and is configured to receive the pass code and to conduct a mathematical manipulation similar to the one used to generate the pass code and to compare the result to the pass code entered into the printer to see if the two codes correspond.

1 A feature enablement module may be provided and is preferably configured to enable
2 a previously disabled feature of the printer in response to the validation module validating the
3 mathematically manipulated character string as a correct pass code for the printer.

4 A method of remotely generating a unique printer pass code recognizable by a printer
5 is also provided under the present invention. In embodiments disclosed herein, the method
6 comprises providing a unique character string for a printer, mathematically manipulating the
7 unique character string, and recognizing the mathematically manipulated character string as
8 a pass code.

9 The unique character string for a printer may comprise a printer serial number
10 resident within the printer, and locating a printer serial number resident with in the printer may
11 comprise locating a printer serial number programmed into a digital controller during
12 manufacturing of the printer.

13 Additionally, mathematically manipulating the unique character string may comprise
14 entering the character string into a computer program which receives the character string as
15 input, conducting mathematical manipulations on the character string, and outputting the
16 result as the pass code. In one embodiment, mathematically manipulating the unique
17 character string comprises truncating the result of a series of mathematical operations on the
18 character string.

19 The pass code is preferably provided to a customer in return for the customer
20 performing a desired action. The pass code is then entered into the printer by the customer,
21 and the printer then conducts a mathematical manipulation similar to the one used to generate
22 the pass code and compares the result to the pass code entered into the printer to see if the
23 two codes correspond.

24 A previously dormant feature of the printer is then preferably enabled in response to
25 a favorable result of recognizing the mathematically manipulated character string as a correct
26 pass code for the printer.

Variable	Mean	SD	Min	Max	Skewness	Kurtosis	Normality
Age	35.5	10.5	18	65	0.1	3.2	0.95
Gender	1.2	0.4	1	2	0.0	3.0	0.98
Marital Status	1.5	0.5	1	3	0.2	3.1	0.96
Education	12.5	2.5	9	16	0.3	3.3	0.94
Income	1500	500	500	3000	0.4	3.4	0.93
Occupation	1.8	0.6	1	3	0.1	3.1	0.97
Health Status	1.2	0.4	1	2	0.0	3.0	0.98
Stress Level	2.5	1.0	1	4	0.5	3.5	0.92
Life Satisfaction	3.5	1.5	1	5	0.2	3.2	0.95
Resilience	2.8	1.2	1	4	0.3	3.3	0.94
Emotional Stability	3.2	1.0	1	4	0.1	3.1	0.96
Social Support	2.0	0.8	1	3	0.2	3.2	0.95
Work-Life Balance	2.2	0.9	1	3	0.3	3.3	0.94
Overall Well-being	3.0	1.2	1	4	0.1	3.1	0.96

Figure 2 is a schematic flow chart diagram illustrating one embodiment of a method of the present invention for remotely generating and using a printer pass code.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring initially to Figure 1, shown therein is schematic block diagram of one embodiment of a printer pass code system of the present invention. As depicted in Figure 1, the system 10 comprises a printer 12 and a pass code generation program 16 resident on a computer 14 that is remote to the printer 12. Shown within the printer 12 is a user interface 18 comprised of a serial number provision module 20 and a pass code reception module 22. In embodiments to be discussed herein, the serial number provision module 20 is configured to locate a serial number 26 and to provide that serial number to a user. The pass code reception module 22 is configured to receive a customer pass code 23 from a user.

Also present within the printer 12 in the depicted embodiment is a controller 24 having resident therein an operative computer software program or code 25 and a serial number 26. The operative computer code 25 is preferably the computer code with which the computer operates. The serial number 26 is preferably a unique number programmed into the controller 24 or other component of the printer 12 during manufacturing of the printer 12.

Other unique characteristics of the printer may be used in lieu of a programmed serial number. These include unique character strings such as product registration numbers or service contract numbers. These character strings may be input into the printer by the customer at some point in the printer life, including at the request of a customer service representative, as will be discussed.

One or more dormant features 28 are also preferably resident within the printer 12 and may be programmed into or controlled by the operative printer code 25. The dormant features 28 are preferably features of the printer such as extra fonts, additional capabilities, automatic drum rotation, and the like for which it is desired that not all customers of the printer initially receive. As discussed above, this may be because not all customers want the feature and are willing to pay for the feature, because the manufacturer wishes to charge more

1 for the feature, or because it is desirable to ensure that the customer performs a requisite act
2 before accessing the feature.

3 The requisite acts may include the customer passing through a special training
4 program, receiving special operating instructions, or merely paying a fee for the use of the
5 dormant feature(s) 28.

6 A feature enablement module 30 of the printer 12 is preferably configured to enable
7 selected dormant features upon receipt and validation of the customer pass code 23. The
8 feature enablement module 30 may likewise be contained within the operative printer code
9 25 or may be independent thereof.

10 The printer 12 is also shown provided with a validation module 32. The validation
11 module 32 is preferably configured to receive and validate the customer pass code 23. In one
12 preferred embodiment, this is accomplished by comparing the customer pass code 23 to a
13 printer version of the pass code 33, and validating the customer pass code 23 if it matches the
14 printer version of the pass code 33. The printer version of the pass code is preferably
15 generated by passing it through a mathematical manipulation module 34 similar to a
16 mathematical manipulation module 42 which is used to generate the customer pass code 23.
17 The validation module 32 may be incorporated within the operative printer code 25 or may
18 be independent thereof.

19 The pass code generation program 16 is preferably retained within the manufacturer's
20 control. In one embodiment, the computer 14 is a customer service computer, and the pass
21 code generation program 16 is accessible to customer service personnel or the like from the
22 computer 14. Within the pass code generation program 16 is a user interface 36 comprised
23 of a serial number reception module 38 and a pass code provision module 40. The user
24 interface 36 is preferably a graphical user interface program such as a standard windows
25 program, from which the customer service representative can access the serial number
26 reception module 38 to enter the serial number provided by the customer and from which the

1 customer may access the pass code provision module 40 to receive the pass code generated
2 by the program 16.

3 The pass code generation program 16 also preferably comprises a mathematical
4 manipulation module 42, which in one embodiment is configured to receive the serial number
5 26 through the user interface 36 and to conduct a series of mathematical manipulations on the
6 serial number and to output the result as the customer pass code 23. The mathematical
7 manipulations may include addition/subtraction 44, multiplication 46, division 48, truncation
8 50, and the like. In one embodiment, the mathematical manipulation also comprises a module
9 45 for transforming alphabetic letters to numbers. The truncation operation 45 is, in one
10 embodiment, used to reduce the pass code to a size that is easily entered into the printer by
11 a user. In one embodiment, the serial number contains seven or more characters, and the
12 truncation module truncates the mathematically manipulated result into a shorter pass code,
13 such as a three digit pass code.

14 Referring now to Figure 2, shown therein is a schematic flow chart diagram
15 illustrating one embodiment of a method 100 for remotely generating and using a pass code.
16 The method 100 begins at a step 102 and proceeds to a step 104, where the printer is
17 manufactured. In one embodiment, the printer comprises the printer 12 of Figure 1 and is
18 configured in the manner discussed above. Coincident with the manufacturing of the printer,
19 a serial number 26 (of Figure 1) is in one embodiment implanted into the printer 12 as
20 indicated at a step 105. The serial number 26 is preferably unique to the printer, as discussed
21 above. Of course, the serial number may be merely stamped or printed on the surface of the
22 printer, in which case, the serial number will have to be manually entered into the printer prior
23 to the step 124.

24 Additionally, as indicated previously, the serial number is but one example of a
25 unique characteristic that may be the basis upon which the customer pass code is generated.
26 Other unique characteristics that may be used, including product registration numbers or

1 service contract numbers are used in a similar manner to the serial number, and consequently,
2 only the use of the serial number will be discussed herein. Nevertheless, this discussion of the
3 use of a serial number should be considered as representative of the use of other types of
4 unique characteristics or unique strings that may be used.

5 As indicated at a step 106, the printer is then sold to a customer. In one
6 embodiment, the printer contains one or more dormant features 28 (of Figure 1) that are not
7 enabled and which remain dormant after the sale of the printer 12. Thus, at a step 108, the
8 customer decides that he/she desires to use one or more of the dormant features. The
9 customer then contacts the manufacturer, for instance, by calling customer service, as
10 indicated at a step 110.

11 As indicated at a step 112, the customer is requested to perform certain requisite
12 actions, and the customer performs these actions. As discussed above, these actions may
13 comprise, for example, special training, receiving certain instructions, or paying a fee. Once
14 the requisite actions are performed, the customer is requested to ascertain the serial number
15 26 of the printer 12. The serial number 26 may be printed on the printer, and be readable by
16 the customer, or the customer may be instructed to access the serial number 26 using the user
17 interface 18. The user interface, through the serial number provision module 20 then
18 communicates with the controller 24 and provides the serial number 26 to the customer. The
19 customer then provides the serial number to the customer service representative, as indicated
20 at the step 114. Of course, if the serial number or other unique characteristic that is to be
21 used as the seed for generation of the customer pass code is already known to the customer
22 representative, step 114 may be omitted.

23 The customer service representative at a step 116 then enters the serial number 26
24 (or other unique characteristic) into the pass code generation program 16 that is preferably
25 resident or accessible through a computer 14 to which the customer service representative has
26

1 access. The customer service representative preferably uses the serial number reception
2 module 38 through the user interface 36, as discussed above.

3 The serial number 26 or other string is then passed to the mathematical manipulation
4 module, and at a step 118, the serial number is mathematically manipulated in a selected
5 manner. In one embodiment, the mathematical manipulation comprises adding selected digits
6 of the serial number together, multiplying the sum by a selected integer, then adding the sum
7 to that product. The result is then truncated into a three digit customer pass code 23. Of
8 course, any suitable manipulation may be conducted, whether mathematical or not. In
9 addition, the mathematical manipulations may include any combination of addition/subtraction
10 44, transformation of letters 45, multiplication 46, division 48, truncation 50, and any other
11 selected operations.

12 The resultant customer pass code 23 is then provided to the customer at a step 120.
13 The customer then enters the customer pass code 23 into the printer 12 at a step 122. The
14 pass code 23 is preferably received by the pass code reception module 22 through the user
15 interface 18. The customer pass code 23 is then provided to the pass code validation module
16 32, where it is validated. A version of the pass code 23 may be programmed into the printer
17 12 during manufacturing of the printer in one embodiment and may be compared to the
18 customer pass code. In a further embodiment, to be described herein, the customer pass code
19 23 is compared to a version of the pass code generated by the printer 12.

20 Under this embodiment, the serial number 26 is accessed by the validation module
21 32. The serial number is preferably accessed from the printer controller 24, but could be
22 manually inputted into the printer 12 by the customer or another person such as maintenance
23 personnel or the customer service representative, as discussed above.

24 The serial number 26 is then mathematically manipulated, preferably in the same
25 manner as the mathematical manipulation conducted by the mathematical manipulation
26 module 42 of the Program 16. The resultant character string is a printer version 33 of the

1 pass code which, as indicated by a step 126, is compared to the entered customer pass code
2 23. As shown at the decision step 128, if the printer generated pass code 33 matches the
3 customer pass code 23, the customer pass code 23 is considered valid.

4 When the customer pass code 23 is deemed to be valid, the dormant feature 28 to
5 be enabled is selected through the user interface 18 at a step 130. Of course, if only one
6 feature is dormant in the printer, this step may be omitted. Selection of the feature may be
7 conducted automatically by the mathematical manipulations, wherein the feature is assigned
8 a code that is embedded into the mathematical manipulations. Alternately, a separate code
9 for the particular feature may be provided to the customer and the customer then enters the
10 separate code.

11 Once the feature or features 28 are selected, the features are enabled by the feature
12 enablement module 30, as indicated at step 136. The method 100 then terminates at a step
13 138.

14 If the result of the validation step 128 is a negative, that is, the pass code is deemed
15 to be invalid, the method 100 proceeds to a step 140, where an error message is returned to
16 the customer. The dormant features 28 are not enabled, and the method 100 ends.

17 As can be seen from the above discussion, several problems existing in the art have
18 been overcome by the system and method of the present invention. A printer manufacturer
19 is now provided with the ability to manufacture and sell printers with dormant features that
20 can be enabled remotely in a controlled manner. Customers may determine a need for a
21 dormant feature after the time of sale of the printer and may enable the feature under
22 supervision of the printer manufacturer. A pass code can be generated based upon a unique
23 characteristic of the printer, such as an internal serial number, and the pass code can be
24 independently verified by the printer prior to enabling the dormant feature.

25 The present invention may be embodied in other specific forms without departing
26 from its spirit or essential characteristics. The described embodiments are to be considered

1 in all respects only as illustrative and not restrictive. The scope of the invention is, therefore,
2 indicated by the appended claims rather than by the foregoing description. All changes which
3 come within the meaning and range of equivalency of the claims are to be embraced within
4 their scope.

5 What is claimed and desired to be secured by United States Letters Patent is:
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